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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR DECEMBER 1934

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FRUIT INSECT INVESTIGATIONS

Cold wave visits Florida.--W. W. Yothers, of the Orlando, Fla., laboratory, reports that the fourth cold wave this year came on the night of December 11. He says, "It looks as if the tangerine crop would be a 100-percent loss. The damage to oranges, I believe, will range from 10 to 25 percent but grapefruit will not be severely damaged."

Steaming fruit containers kills codling moth larvae.--At Yakima, Wash., experiments to determine the best method of destroying codling moth larvae in picking boxes and cannery lug boxes are being conducted by F. P. Dean under the direction of E. J. Newcomer. An apparatus, consisting essentially of an insulated wooden tunnel 40 feet long, with perforated steam pipes in each corner and with a conveyor in the bottom for running the boxes through the tunnel, has been constructed. The steam pipes are connected to a boiler which provides a steam pressure of 60 to 80 pounds. In most of the tunnel a uniform temperature of from 200° to 210° F. is maintained, although in the first 8 or 10 feet the temperature is lower because of the introduction of cold boxes. It has been concluded tentatively that at 200° worms in apple boxes will be practically all killed in 2 minutes; with the heavier lug boxes 3 minutes are required. At 180° probably 3 and 5 minutes will be required. The cost is very low, probably not more than $2.50 per thousand boxes.

Spraying reduces effectiveness of codling moth parasites.--An experiment was conducted by Messrs. Newcomer and Dean to determine the effect of various spray materials on the percentage of parasitization by Ascogaster carpocapsae Vier., an eastern codling moth parasite introduced into the Northwest a number of years ago. In the orchard used for the experiment approximately 45 percent of the hibernating codling moth larvae were found parasitized in the spring of 1934. Data on the percentages of parasitization during the 1934 season indicated that cryolite alone, cryolite with mineral oil, and nicotine sulphate with mineral oil, all reduced the proportion of parasitization by this species. The results are given in the following table:

Treatment	Wormy apples	Parasitized larvae
	Percent	Percent
Cryolite and mineral oil	30.1	7.3
Cryolite alone	36.4	8.6
Nicotine sulphate and mineral oil	46.2	10.6
Unsprayed	94.4	26.6

New quarters for codling moth workers in Northwest.--New quarters have been obtained at Yakima, Wash., for joint occupancy by the representatives of the Insecticide Division and the Fruit Insect Division, who are engaged in codling moth investigations in the Pacific Northwest. The members of the Fruit Insect Division, who have been occupying very unsatisfactory quarters at Yakima, are moving to the new laboratory. M. A. Yothers, who has been in charge of the sublaboratory at Wenatchee, will move to Yakima on February 1, and the Wenatchee sublaboratory will be closed. The members of the Insecticide Division, formerly stationed at Wenatchee, are now moving to Yakima. In the new set-up E. J. Newcomer will be in charge for the Fruit Insect Division and C. W. Murray for the Insecticide Division.

Dispersal habits of codling moth.--Two series of experiments in codling moth dispersal were carried on during the 1934 season in southern Indiana, one at Vincennes, by L. F. Steiner, and the other at Orleans, by D. W. Hamilton. In the Vincennes experiments nearly 1,200 newly emerged adults were marked and liberated in various parts of a large orchard in which experiments with baits were in operation in two areas approximately 1,500 feet apart, and in another corner of which a few light traps were maintained. The average distance traveled by the liberated moths ranged from 130 to 250 feet, varying with the point of liberation. The longest flight, 2,000 feet, from a baited area at one end of the orchard to a light trap at the opposite end, was made by a male. The second longest flight was 1,550 feet, from one baited area to the other, by a female. At Orleans bait traps were maintained in a 35-acre block, and light traps in a 5-1/2-acre block 10 tree rows distant from the baited trees. Marked moths were liberated in both the lighted and the baited areas, as well as in the intervening region, which was neither lighted nor baited. The moths liberated in the lighted area traveled an average distance of 74 feet, those in the baited area 218 feet, and those in the check area 368 feet. No record could be made of the moths that traveled short distances in the check area, which accounts for the higher average. The figure for the larger baited area probably represents more closely the normal movement of moths within an orchard. In this series of liberations the maximum flight was 2,079 feet, entirely within the baited area. Mr. Steiner points out that if the average of 180 feet for all moths recovered in the Vincennes experiments is an indication of the distance normally covered by codling moths, experimental plats as large as 100 trees, with normal planting distances, would not be of sufficient size to offset the effects of migration.

Orchard sanitation aids in codling moth control.--A large-scale sanitation and banding experiment was conducted at Elberfeld, Ind., by Mr. Steiner and A. J. Ackerman, of the Vincennes laboratory, in order to obtain more specific information on the degree of control that may be expected from these practices. In the spring of 1934, 20 acres, or half of a square 40-acre orchard, was thoroughly cleaned up. All rough bark was scraped from the trees and burned, underbrush and surface debris destroyed, and broken branches and split pruning stubs removed. Chemically treated bands were maintained on the trees in the cleaned area during the season. The grower applied four lead arsenate sprays during the season to the entire orchard, not enough for satisfactory control under southern Indiana conditions. The worm catch in the bands approximated from 75,000 to 80,000 in number. Fruit-infestation records showed an important reduction in infestation as a result of the treatment. For one variety this amounted to 36 percent and for the other 47 percent, although the packing shed, an important center of infestation, was located in the cleaned area.

MEXICAN FRUIT FLY CONTROL

Trapping results in southern Texas.--Eleven adult specimens of the Mexican fruit fly were taken in Cameron and Hidalgo Counties, Tex., during December, making a total of 12 flies taken on 11 premises to date this season. Five of these groves were sprayed with nicotine-molasses solution immediately following the taking of the flies. The spraying in the other infested groves was held up pending the harvesting of the fruit. The infestation per trap was slightly less than during the same period last year. Practically all species of fruit flies known to exist in the valley, including *Anastrepha serpentina* Wied., *A fraterculus* Wied., *A.* sp. Seg. 3, *A.* sp. "X", *A.* sp. "Y", *A.* n. sp., *A. pallens* Coq., and *Toxotrypana curvicauda* Gerst., were taken in the traps.

Fruit flies taken on Mexican side of Rio Grande.--The operation of traps in Matamoros resulted in the taking of six adult *Anastrepha ludens* Loew. on four premises. The inspections of importations of oranges and guavas resulted in the recovery of 102 larvae of *A. ludens* and *A. striata* Schin. One carload of Irish potatoes arriving in Matamoros from the State of Vera Cruz was found to be lightly infested with *Epicaerus cognatus* Sharp. This pest hadpreviously been reported in Irish potatoes shipped into Matamoros from the State of Puebla.

Much fruit shipped from Rio Grande Valley.--Express agents throughout the valley report the largest shipments of Christmas-gift packages of fruit since 1931. On six nights previous to Christmas, special express trains of from 10 to 16 cars were required to handle these gift packages. As a large part of this class of shipments is on orders from out-of-State residents, it is evident that prosperity is returning. The truck shipments of fruit were also heavy prior to the holidays. On December 18, 165 truck loads of fruit were checked by the road station, and on each of the 10 days preceding the holidays, more than 100 trucks of fruit were inspected at the station. Grapefruit was being canned by five plants during December. These plants utilized around 1,618 tons of unclassified and Duncan grapefruit for which there was no other market. This amounted to about 106 carloads of fruit which, but for the operation of these plants, would have had to be destroyed by burial.

DATE SCALE CONTROL

Clean-up work at Yuma, Ariz.--During the month of December clean-up work was begun in the Yuma, Ariz., district. The date palms in the city of Yuma were found generally infested in 1923 and some infestations were found in the territory adjacent to the city. The area was pretty well cleaned up by 1928, and since that time scale was found only on old infested properties, the last scale being found in December 1930. The scouting and surveys this year disclosed no infestations outside the known infested area. In the infested area there are numerous palms that were treated in the past and that may harbor leaf-base infestation. Leaf bases on these palms are being pruned and inspected. Also, there are bushy seedling jungles within the area of possible spread from the last infested palms. As it is possible that incipient infestations may exist in some of these, the plantings are being thinned and pruned to facilitate inspection. Past experience has indicated that leaf-base or jungle infestations may exist indetectable by ordinary inspection for a number of years and, with favorable conditions, develop into centers of spread.

Inspection in Coachella and Imperial Valleys.--In the Coachella Valley considerable pruning was done and some leaf-base inspection and inspection in small bushy plantings were made. Several plantings in the infested areas were given their final inspection. In the Imperial Valley inspection was largely confined to the ornamental date palms in the cities of El Centro and Holtville, which are in the area of possible spread from the last heavily infested palms found.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Federal offices hold open house at Lafayette, Ind.--C. M. Packard, Lafayette, Ind., writes: "The Federal building in which our laboratory is located was open for general public inspection from 7:30 to 9:30 p. m., on January 8 and 9, with the whole staff in attendance. For this occasion we had gotten together quite a display of insects in cases, as well as the typical grasses favored by hibernating chinch bugs. Many of the visitors have shown considerable interest in these exhibits, especially those connected with the chinch bug."

Oviparous forms of pea aphid numerous in California.--R. A. Blanchard, Sacramento, Calif., reports that the pea aphid produced more than the normal percentage of oviparous forms in the vicinity of Sacramento late in the fall and early in the winter of 1934. This species usually hibernates in the viviparous form. One female that appeared to be a normal viviparous female, was brought in for cage studies. In the cage this aphid changed to blue green in place of the normal pea green, and on being dissected was found to contain several blue-green eggs and two embryos much larger than the eggs. One of the embryos had its appendages free but the other did not. The female was located on a plant of a strain resistant to aphid attack (which may account for her death); therefore it is uncertain whether both eggs and nymphs would have been deposited normally. On February 24, 1933, a similar female was swept from alfalfa near Santa Barbara. Both females were wingless and had the body shape of viviparous females.

Corn borer conditions in 1934.--A. M. Vance, of the Toledo, Ohio, laboratory, reports that in 1934 a general decrease in infestation of the European corn borer occurred over most of the 1-generation area and in parts of the 2-generation area. The data were obtained during a survey conducted from August 15 to October 5 in 125 infested counties, including 1,580 cornfields in Michigan, Indiana, Ohio, Pennsylvania, New York, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, and New Jersey. However, definite increases in borer populations in 1934 over those of 1933 were found in Monroe and Wayne Counties in western New York, and in New Haven, Middlesex, and New London Counties in southern Connecticut. In New Jersey and western Massachusetts the infestation in 1934 was considerably higher than in 1932, when these regions were last surveyed. The heaviest infestation in the 1-generation area in 1934 was located in the New York counties bordering Lake Ontario, and in a limited area in Michigan and Ohio extending a short distance southwestward from the western end of Lake Erie. In the 2-generation area, the general borer concentration continued to appear in eastern Massachusetts, Rhode Island, southern Connecticut, and on the eastern half of Long Island, N. Y. The general decrease in borer infestation in 1934 in the Great Lakes region is attributed particularly to drought and abnormally high temperatures in May, June, and July. In regions where temperature and moisture were more favorable the borer population in 1934 showed an increase, rather than a decrease.

Stink bug is one cause of pecky rice.--Rice produced in the Gulf States, and especially in southwestern Louisiana, has long been subject to a defect that often seriously lowers its market value. This defect is known to the trade as "pecky rice", a discoloration or spotting of the grain. The causes of this condition have long been in doubt but experiments initiated jointly by the Bureau of Entomology and Plant Quarantine and the Bureau of Plant Industry during the past summer have thrown considerable light on this question. The experiments show that 51 percent of the injury resulting in pecky rice in Louisiana is due to the puncturing of the rice grains by the rice stink bug (Solubea pugnax Fab.) while feeding. The remainder of the injury is due to the action of plant-disease organisms entirely dissociated from the insect. The average degree of pecky rice observed in the plats this year was 35 percent of the grain.

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Control of adult Japanese beetle by mechanical traps.--In December F. W. Metzger, Moorestown, N. J., reported on the relative effectiveness of traps painted green, white, and aluminum. A summary of this report follows. Forty traps of the following types were tested, with intervals of 10 feet between the traps: (A) New type, green and white; (B) new type, all aluminum; (C) old type, all aluminum; (D) old type, green and aluminum; (E) old type, green and white. In this test a total of 910,283 beetles were captured. Taking type A as a standard of 100, the coefficient of the other types as a result of the mean daily differences is as follows: B, 43.4 - .87; C, 41.1 - .87; D, 75.0 - 1.11; E, 84.4 - 1.16. It has been definitely established that traps painted green and white or green and aluminum are more effective in catching beetles than are traps painted entirely with aluminum. Aluminum-painted traps are cheaper to maintain in respect to cost of material, time required for painting, and durability of finish.

Stickers for derris.--Materials such as fish oil and flour, which are commonly used as stickers for the arsenates, have been found by preliminary tests conducted by L. D. Goodhue, Moorestown, N. J., to be inadequate for derris. Consequently, a method has been developed by which a substance can be evaluated as a sticker on plant foliage. The leaf area on a number of potted plants was measured and two groups of plants having equal areas were sprayed by an automatic machine in use at this laboratory. After drying overnight, one group of plants was washed by an apparatus designed to simulate rainfall. The derris on both the washed and unwashed areas was extracted with ether, and finally the percentage removed by washing was determined by the colorimetric method of Gross and Smith. The results on bean foliage were obtained by using a spray mixture containing 1 percent derris and 0.5 percent sticker, except in the case of agar, where 0.25 percent was used. Although agar-agar has proved to be the best sticker in a large number of laboratory experiments, practical difficulties would probably prevent its use in the field. Latex, although easy to use, is rapidly decomposed by sunlight. Blown castor oil appears to be good and is practical. A concentrated emulsion stable for months can easily be prepared with triethanolamine. It can be diluted with hard water without precipitation. The ease of manipulation, the low cost, the extreme tackiness, and the high viscosity are factors which should make such an oil as blown castor a good sticker for derris.

Parasitization of Japanese beetle grubs by Tiphia popilliavora (Korean strain).--T. R. Gardner states that host grubs parasitized this fall with the Korean strain of Tiphia popilliavora Roh. were examined in November and December for cocoon formation. From 16,276 grubs parasitized by Korean females mated with Korean males a total of 10,433 cocoons were formed, a cocoon formation of 64.1 percent. Of these, 697 were discarded because of fungus and disease. From 1,082 grubs parasitized by Japanese females mated with Korean males, a total of 848 cocoons were formed, a cocoon formation of 78.4 percent. Of these, 9 were discarded on account of fungus and disease. From 366 grubs parasitized by Korean females mated with Japanese males a total of 278 cocoons were formed, a cocoon formation of 75.9 percent. Of these 14 were discarded owing to fungus and disease. The cocoons were placed in the regular single-neck emergence vials, capped, and stored in one of the temperature-control chambers for overwintering.

JAPANESE BEETLE CONTROL

Japanese beetle control in Charlottesville, Va.--Five tons of arsenate of lead were applied between December 3 and 7 to the premises on which 60 Japanese beetles were trapped in Charlottesville last summer.

Winter campaign for eradication of Dutch elm disease started.--Announcement was made early in December of the allotment of $677,000 by the Public Works Administration for control of the Dutch elm disease. As the fiscal year's appropriation bill provided that any funds allotted for this work from other government sources should first be used to reimburse the regular account, the P. W. A. allotment was reducible by $150,000, the amount of the regular Bureau appropriation. The first eradication crews to be placed in the field under the new program began their work on December 27. The number of men engaged in scouting for dead and dying trees and eradicating confirmed or otherwise tagged trees was rapidly increased as transportation facilities and equipment became available. Trees removed during December throughout the area included 61 confirmed Graphiums, and 1,045 dead and dying elms. Confirmed elms standing at the end of the month numbered 1,320 in

New Jersey, 4 in New York, and 1 in Connecticut. At the end of the year, scouts engaged in elm-tree surveys had tagged 8,388 dead and dying elms in Connecticut, 35,179 in New Jersey, and 17,912 in New York. Of these, 201 had been removed in Connecticut, 652 in New Jersey, and 323 in New York, leaving 60,303 standing. At the end of 1934 the total Dutch elm disease infected zone in the tri-State area included 2,464 square miles. The additional 10-mile protective zone included 2,170 square miles. Of this total work area, 55 percent is in New Jersey, 34 percent in New York, and 11 percent in Connecticut.

Root sampling discloses Dutch elm disease when trunk sampling fails.--Experiences in obtaining samples of suspects for culture in connection with the locating and tagging of dead and dying elms show that root sampling may indicate the presence of infection when the trunk has become too dry for fungus development. Root sampling is resorted to when the trees are dead above the ground. It has proved to be accurate in establishing the presence of the disease in dead and dying elms. In one instance seven trees in a single group were sampled from the roots and confirmed as Graphium diseased, although samples previously taken from the trunk were too dry for satisfactory culture development.

Long Island farmers cut corn stubble close.--Observations in connection with a stubble count recently completed by the inspector supplying Federal corn borer certification on Long Island, show that many of the farmers this year cut their stubble at the ground level. This is particularly apparent where the soil is sandy and where good cultivation was carried out during the growing season. Many fields have been sown to rye after the low-cut stubble was harrowed. Not much corn is raised on the eastern end of Long Island, therefore it was with difficulty that the inspector located cornfields there for counts of infested stubble.

FOREST INSECT INVESTIGATIONS

Lumber company salvages beetle-infested trees.--J. M. Miller, of the Berkeley, Calif,,laboratory, reports that the McCloud Lumber Company is now engaged in a program of removing and utilizing insect-infested pine trees from its holdings in northern California. Infested trees are located and marked in the woods by qualified insect-control spotters. Before the bark-beetle broods can emerge, these trees are felled, cut into log lengths, and hauled by truck to the railroad, where they are transported to the company's mill at McCloud. The unused part of the tree, consisting of top and limbs, is burned in the woods. So far the company has been able to deliver logs from these selected trees to the railroad at a cost of $6.50 per thousand board feet, only $2 more than the cost of treating trees by the regular method of burning them in the woods, which involves practically total loss of the merchantable lumber. In this operation the lumber company has found a market for the blue-stain lumber, which composes a high percentage of the material cut from beetle-attacked trees. Intensive studies of the economic possibilities of this type of insect control and salvage have been planned by the Berkeley laboratory.

Bark beetle infestations increase in northern California.--Mr. Miller also reports that field work of the 1934 survey, to locate areas of bark beetle infestations in Region 5, was completed by November 15. The more important timber-producing areas in eight national forests extending from central to northeastern California were covered. Aggressive infestations of the western pine beetle prevail throughout northeastern California, being particularly virulent in areas where the beetle populations had suffered a setback from the severe low temperatures of December 1932. The effect of the high mortality, resulting from the freeze, on the course of the infestation was evident only during the season immediately following--that of 1933. Recovery of the beetle populations was evident toward the close of the 1933 season, and in 1934 the upward tendency was continued, showing marked acceleration in places. One trend exhibited by current infestations is that of extension of aggressive attacks to valuable timber stands that had not suffered severe losses until this year. Examples of this tendency are to be found in the Lassen National Forest. Infestation tendencies can now be recognized as similar to those which appeared on certain areas of the Modoc National Forest in 1924 and which have reduced the stands until they are no longer of commercial value. In contrast to these conditions in northeastern California, the pine belt of the central Sierra region contains declining infestations of low intensity. Areas conspicuous because of highly epidemic conditions in 1932 suffered minor losses in 1934.

Larva of western pine beetle undergoes four instars while feeding.--K. A. Salman, Berkeley, reports that a large number of individuals were collected at the Hackamore field laboratory in Modoc County from a series of infested trees at intervals of a few days and were placed in alcohol for further study. Last fall the material was examined to determine whether the width of the head capsule of larvae is a characteristic of the stage of development. When head-width measurements were plotted against frequency, it was found that four distinct peaks appeared in the graph of the sample, which contained over 1,200 individuals. These peaks indicate that for this species there are four instars. It was found that part of the second and all of the third and fourth instars are undergone while the larvae are feeding in the outer bark of ponderosa pine, and that the first and part of the second stadia occur during the feeding period in the phloem. It was also determined that the mean measurements of populations that had developed under abnormal conditions were noticeably smaller than those of the same stadia of a sample representing a population feeding normally. This discrepancy is believed to be due to the effects of an abnormal environment on growth, probably because of nutritional deficiencies.

Alder flea beetle decreases in northern Idaho.--H. J. Rust, of the Coeur d'Alene, Idaho, laboratory, reports a very early and abundant emergence of hibernating adults of Altica bimarginata Say in April 1934, as a result of the preceding mild winter and the unusually early warm temperatures. When emergence was complete the distribution of adults was very extensive and heavy feeding was observed on young alder, aspen, cottonwood, and willow foliage. This feeding continued well into June and constituted the most destructive part of the season's activity. The normal number of eggs were laid, but there was a heavy mortality of both eggs and larvae, resulting in a light emergence of second-generation adults.

Secondary bark beetles assume primary role in destruction of lodgepole pine.--A. L. Gibson, Coeur d'Alene, reports that mountain pine beetle attacks in the bole of lodgepole pine usually precede a "fill-in" of the top and branches by myriads of smaller bark beetles, chief of which are *Pityogenes knechteli* Sw., *Pityophthorus burkei* Blkm., and *Ips oregoni* Eich. So long as the mountain pine beetle infestation is increasing, there is sufficient host material provided for these secondary insects, but any sudden and decided decrease of an outbreak apparently leaves insufficient ready-made food and the secondaries invade the green timber. On the Beaverhead National Forest in Montana the mountain pine beetle epidemic dropped from 17,000,000 trees in 1932 to 900,000 in 1933. As a result of this severe decrease, many hundreds of thousands of small trees were killed by the secondary bark beetles in 1933 and early in the summer of 1934, but there was a decided decrease in the number of trees killed by these insects during the latter part of the summer. As similar outbreaks of these usually secondary insects last only a year or two, serious losses to the remaining stand on the seriously devastated areas of the Beaverhead National Forest are probably over, at least for the present.

Insecticidal control of beech scale.--C. E. Hood, of the Melrose Highlands, Mass., laboratory, has been conducting spraying experiments during the past few years for the control of the beech scale to ascertain the effects of various mixtures, not only on the scale itself but also on beech trees. As a result of his studies, Mr. Hood states that he would not recommend using miscible oil for the control of the beech scale and adds that lime-sulphur mixture, used at the rate of about 7 gallons to 93 gallons of water, is an efficient and safe remedy.

Spray deposits on foliage in dense and open stands.--S. F. Potts, Melrose Highlands, has found in connection with his spraying experiments that leaves of certain species of deciduous trees and white pine are thinner on trees growing in a dense woodland than are the leaves of the same species growing in the open. For this reason the weight of insecticide deposit on a given weight of foliage may be as much as 30 percent greater when the insecticide is applied in the dense woodland than when it is applied to trees growing in the open.

Spraying wet foliage and dry foliage.--Mr. Potts has submitted a summary giving results obtained in spraying woodland plots in September to determine whether wet foliage can be satisfacterily sprayed with lead arsenate, fish oil, and water. One plot was sprayed when the foliage was perfectly dry and the other immediately after a heavy rain, using the same mixture at the rate of 5 pounds of lead arsenate and 20 ounces of fish oil to 100 gallons of water. Very good coverage was obtained on the under surface of the leaves in the wet plot. On the upper surface the deposit was fair in distribution and quantity, though not quite as heavy as in the dry plot. It took 10 percent less spray and 10 percent less time to cover the wet plot than the dry one. In the dry plot 53 percent of the lead arsenate applied was deposited on the foliage, as compared with 55 percent in the wet plot. In the dry plot 60 percent of the original deposit remained on red oak foliage after 3.32 inches of rain, and 53.9 percent on white pine foliage after 3.84 inches of rain. In the wet plot 58.2 percent of the original deposit remained on red oak foliage after 1.28 inches of rain, and 59.8 percent on white pine foliage after 1.80 inches of rain. From previous experiments it is known that the first half inch of rain removes as much of the deposit as the next 1-1/2 inches.

Beech scale found in New York.--Infestations of the beech scale have been found in Scarsdale, Westchester County, N. Y., and immediate vicinity. The presence of the insect there was reported indirectly to the Melrose Highlands laboratory by R. P. Marshall, of the Bureau of Plant Industry. On December 11 and 12, R. C. Brown and C. L. Griswold, of the laboratory, made a rough survey in that section, examining beech trees along the principal parkways. Very light infestations were found at six localities within a radius of 6 miles from Scarsdale. This is the first time the scale has been reported as being present in New York.

GYPSY AND BROWN-TAIL MOTH CONTROL

Gypsy moth control in Pennsylvania.--When gypsy moth extermination work was first begun in Pennsylvania, there were large areas in the generally infested district so covered with tangled masses of worthless and dead trees and brush that it was almost impossible to penetrate these thickets; therefore, little control work could be done until after extensive thinning. A considerable number of acres have been cut over since the work started. After thinning it is necessary to follow up the work every year to remove new sprouts. This year the State has sponsored a gypsy moth control project in Luzerne County. Work under this project is given to unemployed, who are assigned to cutting trees and also to rough creosoting work in the more heavily infested areas. About two hundred men are engaged regularly in cutting, in removing sprouts, and in rough creosoting. Areas cut over have all but the best of the tree growth removed. Any wood of value for fuel is saved, and all the brush, slash, and debris is gathered in piles for burning. Care must be exercised in the choice of sites where these piles may be burned because the outcroppings of coal veins may be so close to the surface that they may be ignited if fires are built over them. Before any burning is undertaken the superintendents of the collieries in the districts are consulted.

C. C. C. work in New England.--Gypsy moth control work in Vermont, Massachusetts, and Connecticut was continued during the month, the numbers of men employed ranging from four hundred to nearly five hundred. Since the first of July the camp men have examined trees along 143 miles of roadside, scouted 58,512 acres, examined 151,000 trees in open country, and cleaned 481 acres of woodland, removing 2,768 worthless trees. A total of 291,465 new gypsy moth egg clusters have been creosoted, as follows: 198,942 in Massachusetts, 69,795 in Connecticut, and 22,728 in Vermont. Transportation facilities for gypsy moth work are inadequate in most camps and more men would be put on crews were transportation available.

More C. C. C. work in gypsy moth control proposed.--A proposal has been made to the United States Forest Service for a substantial increase in the Federally supervised gypsy moth work east of the barrier zone, from camps in four New England States. This plan, if put into operation, will involve the use of men in approximately 40 camps already established and in the establishment of 11 new camps. About 6,000 men would be used. In most of the camps, the work would be continuous throughout the year, and the program calls for a gradual moving eastward as the areas are cleaned up. Contacts have been made with Forest Service and State officials having charge of the emergency conservation work in New Hampshire, Vermont, Massachusetts, and Connecticut. The proposal of increase is for the fifth enrollment beginning April 1.

PLANT DISEASE CONTROL

Blister rust control in Shenandoah National Park.--The Shenandoah National Park in Virginia concluded its second successful season's work in the control of the white pine blister rust. Most of the work was along the Skyline Drive and along Lee Highway at the entrance to the drive. In 1934 Ribes were eradicated on over 6,900 acres of land, 579,699 wild gooseberries being destroyed by 6,371 man-days of C. C. C. labor. In addition, 83 acres were reworked where seedlings had sprung up, 25,525 bushes being removed by 82 man-days of labor. A number of white pines have already been found infected with the blister rust in the park and, now that the Ribes have been destroyed, it is proposed to save these trees by removing the diseased parts. In several places along Skyline Drive young white pines are beginning to restock areas in which the chestnut trees have been destroyed by chestnut blight.

Bulldozer used to eradicate Ribes in West.--Developmental work performed during the last few years on the problem of eradicating dense concentrations of Ribes in the stream-type sites in the Inland Empire (the Idaho panhandle and adjacent territory) have demonstrated that under some conditions Ribes can be removed by heavy machines at a cost as low as by hand methods or by the use of chemicals. The machine used in this work is known as a bulldozer, and consists of a Caterpillar 50 gasoline tractor equipped with a master bulldozer frame and lift, special 18-inch closed tract, and a brush rake. On the average, 5.11 machine-hours per acre were used. The four-man crew that operated this machine was divided into two units, each consisting of a tractor driver and a ground pilot. The units work two shifts. The ground pilot observes the conditions immediately ahead of the machine and by hand signals indicates to the driver the set for the machine blades. The heavy Ribes areas are located in advance of the bulldozer crew and maps are furnished showing the areas to be worked. Obstacles, such as beaver dams, are removed from an area before work is begun, and the ground is permitted to dry before the bulldozer is put on it. This machine plows beneath the surface, uproots the plants, and gathers them in piles where they remain to dry, after which they are burned. After the Ribes and tangled masses of brush are removed, grass seed is sown to establish a sod. This largely prevents or retards the reestablishment of Ribes and other brush-plant seedlings and turns the area into a pasture type.

Blister rust aecia found late in November.--T. J. King, blister rust agent in New Hampshire, had the rare experience of finding blister rust in the aecial stage late in November. He reports that on November 23, while laying out an infection-study area in a natural pasture seeding in the town of Loudon, in Merrimack County, to determine the need of control work, he found two blisters near the base of a 10-year-old pine. These blisters were apparently as fresh and full as those found in the early spring months. On returning a few days later to photograph the blisters, he noted that one of them had lost its contents and looked very much as blisters do after their spores have been disseminated late in the spring. The other blister was still unbroken and was photographed.

COTTON INSECT INVESTIGATIONS

Soil animals in cotton fields.--Reporting on the season's work on soil animals occurring in cotton fields in eastern Texas, L. D. Christenson, College Station, Tex., says that the soil fauna was roughly divided into (1) the smaller animals, including such forms as the Acarina, Protura, Pauropoda, Symphyla, and the smaller Insecta, Araneida, Myriopoda, and terrestrial Crustacea; (2) the larger soil animals, including the larger myriopods, spiders, and insects such as white grubs, wireworms, mealybugs, and root borers. The smaller-animal populations were found to average around 50 million per acre in the top 12 inches of soil, being about half as abundant as last year. No pitting or injury of importance was noted on the older roots. A few young, tender root ends were injured. It must be concluded that in this region these smaller arthropods do not seriously affect cotton-plant development. Large numbers of Pseudosinella violenta (Fols.) did not even hinder germination of cotton seeds. In cotton fields Thysanura and Collembola attain their greatest concentrations after the crop is made. The types of organisms that might feed on cotton roots are usually confined to the upper 12 inches of soil, leaving the entire root system below free from attack. It was thought that under adverse conditions such as drought, large numbers of these smaller animals might concentrate on the roots leading from deeper soil strata and by feeding there might affect circulation. This did not prove to be so during last summer's drought. The main roots in the upper 12-inch layer were as unharmed as during the previous season, being evidently too tough or unpalatable for these forms, which are typically feeders on fungus and decaying organic matter. The extreme conditions resulted in a reduction of the surface forms of the larger soil animals and a reduction of the larger insects underground, as many were unable to move successfully through their normal environment in search of food or to avoid extremes. The white-grub population was reduced from about 30,000 larvae per acre last year to about 4,000 per acre this year. The digging showed that the drought and resultant soil hardness was partly responsible. Most of the grubs were found entrapped in cavities slightly larger than themselves, in the 8- to 12-inch layer. With few exceptions, those found were yellowish and flabby and, judging from stomach contents, had been without food for a long time. Many cavities contained the dried, shriveled remains of their former inhabitants, with no evidence of fungitic or parasitic attack, indicating that such confinement was fatal. As for injury to root systems of the cotton plant by larger soil animals, none of consequence was observed during last growing season. Besides white grubs and wireworms, larger soil arthropods were rare, only three kinds being observed during the hot, dry summer--Gryllus assimilis Fab., a species of Chilopoda, and a species of Diplopoda. Usually they were found deep in the soil, G. assimilis using the almost universal shrinkage cracks to avoid extremes of temperature.

Cotton flea hopper activity.--K. P. Ewing and R. L. McGarr discontinued their flight screens for cotton flea hopper collections at Port Lavaca, Tex., on November 28. There was very little activity of the hopper after October 12 and none were taken on the screens after November 17. The numbers of hoppers taken on 12 flight screens in 1933 and 1934 were as follows:

Year	April	May	June	July	August	Sept.	Oct.	Nov.	Total
	No.	No.	No.	No.	No.	No.	No.	No.	No.
1933----	615	1,990	3,799	6,097	1,409	1,117	177	2	15,206
1934----	79	2,220	5,124	3,544 1/	722	777	846	8	13,320

1/Collections were not made from July 25 to 31, owing to destruction of screens by the storm.

The small number (77) taken in April was apparently the result of the croton clean-up in Calhoun County the winter before. The reduction in hopper population was strikingly evident until heavy migration started about May 6 during a rainy, windy period. It is thought that this heavy population was due to migration from outside the clean-up area. Damage to early cotton was very severe. The tropical hurricane of July 25 apparently destroyed many hoppers and checked breeding for a time, but it also ruined the cotton. The heavy rainfall during the summer produced an abundant growth of wild host plants and by fall the hopper population had become heavy. Considering the large numbers of host plants and adults present, it is expected that the winter carry-over of eggs will be large. Nine generations were reared in the insectary during the season, starting with the first field-collected nymph on April 9 and ending with an adult on October 19.

Pink bollworm parasite in the Laguna.--C. S. Rude and S. L. Calhoun, of Tlahualilo, Durango, Mexico, report that the regulations of the Mexican Department of Agriculture requiring all cotton fields to be cleaned of stalks by November 15 were well observed by the planters. The field in which the pink bollworm parasite Exeristes roborator was released and established this summer had to be cleaned, and bolls containing parasites were collected and stored. Adults that emerged during the fall were supplied with bolls containing pink bollworms, and several thousand field-collected and laboratory-bred laggard larvae of the parasite were saved. A general interest is being shown in following up this clean-up by delayed planting and it is quite probable that cotton planting will be delayed about 2 months next season. Very little irrigation water has been received from the Nazas River for use in planting next year's crop.

Withholding late irrigation reduces pink bollworm damage.--A. J. Chapman conducted experiments at Presidio, Tex., to determine whether by withholding late irrigation it was possible to reduce the pink bollworm infestation without materially reducing the yield of cotton. Two varieties of cotton--Acala, which is largely grown in the community and is not a quick-maturing variety, and Bennett, which does mature quickly--were used. The results show that pink bollworm damage and the number of overwintering larvae were greatly reduced by with-

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holding the late irrigations. Although the yield was also greatly reduced in both varieties in one series of experiments it was not materially reduced in the early maturing Bennett variety in the other series. The most critical point is the time of applying the last irrigation. The last water should be applied late enough to afford sufficient moisture to mature the crop, but not late enough to stimulate a second growth and late fruiting. In this year's experiments the irrigations were stopped too early and there was considerable shedding and premature opening of bolls in the plots given no late irrigations. There would probably have been considerable increase in yield with very little increase in infestation had the last irrigation been applied about August 10.

Boll weevil control in Mississippi.--Results of last season's tests for boll weevil control at State College, Canton, and Hattiesburg, Miss., have been received from H. C. Young, State College. The climatic conditions were such that the boll weevils were held in check and never became very numerous. The cotton crop matured early at all three places. The dusting experiments were planned to determine the value of early and late control under Mississippi conditions. Early, or presquare, dusting with calcium arsenate alone did not control the weevils and when followed by the regular calcium arsenate treatment after 10 percent infestation did not increase the effectiveness of the regular treatment. The regular calcium arsenate treatment, i. e. dusting after 10 percent infestation in the squares and continuing at 4 or 5 day intervals as long as needed, gave a profit of $1.66 an acre at Canton, $3.27 at State College, and $6.08 at Hattiesburg. The increased yield and the profit was rather low at all three localities, owing to the light infestation. More profitable returns ($6.98 per acre) were obtained by not dusting until late in the season and then dusting from two to three times about the time migration started. These late-season dustings gave surprisingly good results and will be further tested.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Eradication of wild cotton in southern Florida.--By the end of December recleaning had been completed in Pinellas, Hillsborough, Manatee, and Sarasota Counties, and most of the area in Charlotte County had been completed. All of these counties are along the west coast. Of the mainland keys, Upper and Lower Matecumbe and Plantation Keys have been completed, considerable progress has been made on Key Largo, and work is just getting under way on Long Key. In the above areas 1,049¼ acres were recleaned, from which were removed 232 mature plants previously missed, 373,184 seedlings, and 52,700 sprout plants. In addition, in Monroe County, 25 acres were cleaned for the first time, 3,250 mature plants being removed. This area was in reality an offset of the main colony, and for some reason had been overlooked during previous clean-ups. In the first part of the month unusually low temperatures killed the leaves on many tropical plants, including wild cotton. This has made the detection of cotton plants extremely difficult. However, the disadvantage has at least been partially offset by the cold weather, which stopped the cotton from fruiting and prevented the maturing of any green bolls less than half grown. Recent reports indicate that some of the cotton plants have already begun to put out new leaves, but other plants have not and it should soon be fairly easy to distinguish the wild cotton. In connection with the clean-up, 773 bolls were inspected without finding any specimens of the pink bollworm. However, 2 bolls on Key Largo showed evidence of having been attacked by the pink bollworm.

Field clean-up in Texas nears completion.--The first heavy frost of the year occurred in the Big Bend section of Texas on November 21 and 22, which killed all of the cotton, and shortly thereafter the farmers were able to begin the final picking of the top crop. This made practically all of the fields available, and as a result field clean-up went forward very rapidly. During December stalks were cut on 2,565 acres, with hand-picking and burning of the material being completed on 2,778 acres. Of this amount, 110 acres were in Brewster County, completing the work there. When the Brewster County fields were cleaned last season innumerable squares and small bolls, which had been shed because of the pink bollworm, were on the ground. As the damage was very light this season, there was practically no shedding, and this acreage was cleaned much more rapidly than had been expected. There are approximately 1,000 acres to be cleaned in Presidio County. It is estimated that this can be completed within the next 10 days or 2 weeks. From time to time during the course of field clean-up, the inspectors have been examining bolls taken at random from stalks and also some from the ground. They all report that the number of live worms found is considerably less this year than during the 2 previous years while field cleaning was in progress.

Pink bollworm inspection.--On December 31, one interception of material made at the Marfa, Tex., road station was found to be infested with the pink bollworm. This interception, from a truck en route from the Big Bend to Marfa, consisted of 16 locks of seed cotton, and 2 dead pink bollworm larvae were found. During the month, 1,070 cars were inspected and only 3 interceptions made. Throughout the present season there has been a considerable decrease in the number of interceptions made at the station, as compared with past seasons. This is due mainly to the reduction of the infestation in the Big Bend and also to the fact that the inspectors have endeavored to educate travelers to the necessity of thoroughly cleaning their cars or trucks before leaving the area. Another reason is that the Mexican cotton pickers who go to other sections to pick each season have learned that they cannot bring out pillows, mattresses, and other articles made from seed cotton. As the field clean-up is nearing completion, it will soon be possible to discontinue the road station.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Conference on arsenical substitutes.--From January 3 to 12, inclusive, a conference was held in Washington, D. C., for the purpose of completing plans for the projects to be conducted in the South this year on arsenical substitutes, and for the coordination of the general program. Attending this conference were C. F. Stahl, Sanford, Fla.; W. D. Reed, Richmond, Va.; W. A. Thomas, and L. B. Reed, Chadbourn, N. C.; K. L. Cockerham, Biloxi, Miss.; C. E. Smith, Baton Rouge, La.; J. U. Gilmore, Clarksville, Tenn.; W. J. Reid, Jr., Charleston, S. C.; and H. C. Mason, Columbus, Ohio.

Damage by tomato pin worm in southern California.--J. C. Elmore and R. E. Campbell, of the Alhambra, Calif., laboratory, report that the actual loss in San Diego County of infested tomatoes discarded because of infestation by Gnorimoschema lycopersicella Busck is estimated by the county agricultural officials as ranging from $100,000 to $200,000 annually, or from 20 to 40 percent of the entire crop. Orange County has a proportionate loss, while Ventura and Los Angeles Counties will average slightly less. Tomato packers report that, owing to the extra care required in packing and in culling infested tomatoes, packing costs this year exceeded those of previous years by approximately 5 cents per box. To this cost should be added the cost of attempted control, which approximated $35,000 in San Diego County, together with an additional cost to the county of approximately $15,000 for extra inspection during the packing period. In 1934 extra shipping and market inspectors were required to remove infested fruit and to watch out for harmful residues on the marketed product.

Nightshade clean-up aids in control of pepper weevil.--Mr. Elmore also reports final results obtained in the clean-up of nightshade, the principal wild host plant of Anthonomus eugenii Cano, as an aid in the control of that pest. A cooperative demonstration was conducted by county and Federal agricultural workers, with the aid of interested pepper growers. In this demonstration the nightshade was destroyed in an area of 10 square miles, and a similar area of 10 square miles, where the nightshade was not destroyed, was used as a check. In the area cleaned up the loss was 25 percent, whereas in the untreated area it averaged about 75 percent.

California may expect an outbreak of the lima bean pod borer.--Rodney Cecil, of the Ventura, Calif., laboratory, reports that continuous rains from October 1 to the end of December have favored the growth of several species of lupine that function as host plants of the lima bean pod borer. The abundance of these wild host plants affords favorable conditions for the development of a large brood of the borer that may be expected to infest lima beans next season.

Pea weevil infestation varies widely in Idaho and Washington.--T. A. Brindley, Moscow, Idaho, reports that data obtained by the Bureau of Agricultural Economics in cooperation with the University of Idaho show a great variation in the degree of maximum infestation of the pea weevil in different fields in the Palouse district of western Idaho and eastern Washington. In 20 localities in western Idaho the infestation in different fields ranged from 2.6 to 55.6 percent. In 35 localities in eastern Washington it ranged from 0.6 to 33.3 percent. These figures were based on approximately 1,600 records of infestation.

Fall weather in southern Arizona favored heavy population of beet leafhopper.--Van E. Romney, of the Phoenix, Ariz., sublaboratory, reports that fall weather conditions over the southern Arizona breeding area were favorable to the late summer and fall host plants of the beet leafhopper and caused the germination of good stands of the winter host plants. As a result, leafhopper populations appear to be rather high over the entire breeding area. Should precipitation be sufficient to maintain the host plants until next May, heavy migrations of the beet leafhopper may be expected from these breeding grounds into the beet-growing districts of western Colorado and eastern Utah.

Derris effective against harlequin bug, tests indicate.--L. W. Brannon, of the Norfolk, Va., laboratory, reports that in field-cage toxicity tests an average kill of 95 percent of the harlequin bug was obtained by using a derris-root dust containing 0.75 percent rotenone, with talc as a diluent. Slightly better results were obtained with derris-root dusts than with the derris sprays. Of the sprays used, the best results were obtained with derris-root powder in water at the rate of 1.5 pounds (containing 5 percent rotenone) in 50 gallons of water, using 1 pound of high-grade powdered soap as a wetting agent and sticker.

Harmful residues on cabbage may be avoided.--W. J. Reid, Jr., and C. O. Bare have summarized the general results obtained at the Charleston, S. C., laboratory during the 2 years of residue tests on cabbage as follows: (1) On cabbage marketed as U. S. Grade No. 1, ordinarily bearing four outer loose leaves, insecticides producing arsenical residues should not be applied within a period of 40 days prior to harvest nor after the plant begins to form a head. (2) On cabbage marketed as U. S. Grade No. 1 (green), ordinarily marketed as an entire plant with not more than 7 loose outer leaves, arsenical insecticides should not be used at any time. (3) In general, none of the insecticides harmful to man should be applied to any part of the plant that is to be used as food. (4) The amount of rainfall during the growth of the plants evidently influenced the quantity of residue that remained on the plants at harvest, but apparently did not greatly affect the duration of the period before harvest that the insecticides could be applied safely without exceeding the legal tolerance. Substantially the same results were obtained in a similar series of tests by C. E. Smith at the Baton Rouge, La., laboratory.

Cultural methods control sand wireworm.--J. N. Tenhet, Fairfax, S. C., reports that unsatisfactory results were obtained in all attempts to control the sand wireworm by direct methods. However, control was achieved by the proper application of cultural methods, including resting of the land, attention to favorable planting dates, avoidance of attracting the egg-laying female beetles, increasing the soil fertility with humus, and crop rotation.

Strawberry tarsonemid mite synonymous with cyclamen mite.--F. F. Smith, of the greenhouse-insects laboratory, Washington, D. C., found as a result of interhost transfer with living cultures of the strawberry tarsonemid mite (Tarsonemus fragariae Zimm.), received from California, that T. fragariae responded in the same manner as did T. pallidus. This was also confirmed by experiments conducted by Leslie M. Smith, of the California Agricultural Experiment Station. As a result of extensive examination by Mr. Smith and H. E. Ewing, of the National Museum, of preserved specimens from California and England, it was concluded that T. pallidus and T. fragariae are alike morphologically and are apparently similar biologically.

Hot-water treatment controls iris thrips.--In preliminary tests for the control of the iris thrips, Mr. Smith found that by placing an iron cylinder (ash-can with bottom removed) over the plant, thrusting the edges into the soil far enough to hold the water around the plant, the hot-water treatment can be applied to infested clumps without digging or otherwise disturbing the plants, thereby avoiding a temporary setback and the loss of 1 year's crop of flowers, which would result if the plants were lifted for treatment. After the soil was warmed with water at 120° F., the cylinder was filled with water at 114° until the foliage was covered. The cooling effect of the plant and exposure to the air lowered the temperature to 111°, and by adding more water at 114°, this temperature was maintained for the 30-minute period required to kill the thrips. All thrips on such treated plants were killed. The plants were uninjured by the treatment and were going into winter dormancy satisfactorily.

Factors affecting degree of infestation by narcissus bulb fly.--Ralph Schopp, of the Sumner, Wash., laboratory, in determining the effect of the type of soil and the depth of planting (4, 6, and 8 inches) on the degree of infestation by the narcissus bulb fly, found that there is evidently a greater survival of larvae in peat soil than in silt and that survival is greatest at a depth of 6 inches.

Fumigation with methyl formate-carbon dioxide gas effective against two tobacco pests.--W. D. Reed, Richmond, Va., reports that in recent tests with methyl formate-carbon dioxide gas against the cigarette beetle and the tobacco moth in vacuum chambers, it was found that at 78° F. a dosage of 25 pounds per 1,000 cubic feet, with an exposure of 3½ hours, or a dosage of 15 pounds per 1,000 cubic feet, with an exposure of 17 hours, was effective. When the tobacco was exposed to a temperature of 62°, a dosage of 30 pounds of the fumigant per 1,000 cubic feet, with an exposure of 3½ hours, or a dosage of 20 pounds per 1,000 cubic feet, with an exposure of 17 hours, was required.

INSECTS AFFECTING MAN AND ANIMALS

Effectiveness of treatment recommended for screw worm.--That the campaign for educating farmers and stock raisers of the Southeastern States in the proper methods of treating screw worm cases was badly needed, is borne out by the following excerpt from the report of D. C. Parman, who had charge of the work in Mississippi: "The work was favorably received by the people and was a conclusive demonstration of the prophylactic value of the recommended measures and the nontoxic effect of the treatments. Most of the people thought that any serious case of worms would kill an animal, and when the work was begun many animals were being left to die or were being shot. A good demonstration was made at one place where one cow had been shot and another was about to be. I insisted that the cow could be saved in a few minutes with a few cents' worth of medicine. In less than 10 minutes the wound was cleaned and dressed, using approximately 2 ounces of each medicine (benzol and refined pine-tar oil). Although the cow appeared to be too weak to walk when the treatment was begun, almost as soon as it was finished she took on new life and began to feed. She was completely healed in 2 weeks, with only three more light applications of pine-tar oil."

Continuation of F. E. R. A. screw worm project in Georgia.--In Georgia the educational campaign for screw worm control has been extended so as to permit promotional work in construction of stock pens and chutes on the open range for the purpose of treating screw worm cases. An additional allotment of $5,000 for a period of 16 weeks from the F. E. R. A. makes possible the employment of 4 or 5 men for this work. Projects are to be started in the different counties having open ranges, with labor and some of the materials to be furnished by the county F. E. R. A. organizations. The State veterinarian and the Bureau of Animal Industry are cooperating in supplying pens needed for testing cattle. The same pens can be used for both screw worm and tuberculosis work.

Ectoparasites of deer in Pisgah National Forest.--H. S. Peters, Takoma Park, Md., spent a week early in December in examining deer killed by hunters in the Pisgah National Forest, N. C. This was during a special hunting season arranged by the Forest Service in an effort to reduce the number of deer in this forest. The work was done in cooperation with L. C. Morley, of the Bureau of Biological Survey, and W. M. Rush, of the Forest Service. Fifty carcasses of Virginia white-tailed deer were examined. They were found to be in excellent condition, showing only a very light infestation of Mallophaga and, in two cases, of Anoplura. The Mallophaga were mostly Tricholipeurus virginianus Peters with a few T. parallelus Osborn. The Anoplura were determined as Cervophthirius crassicornis Nitzsch. No ticks, hippoboscids, or mites were found and practically no internal parasites or disease of any kind.

Sand fly breeding at Nassau, Bahama Islands.--At the request of Americans residing at Nassau in the British Bahamas, and with travel funds provided by them, J. B. Hull, of the Fort Pierce, Fla., sublaboratory, spent about 10 days in the Bahamas studying the sand fly situation on New Providence and Hog Islands From examinations of the swamps and with tests for salinity and for sand fly larvae, he was able to locate the breeding places of sand flies and to designate the more important places. On account of the coral formation and the prevailing opinion that salt seepages occur on these islands, Mr. Hull suggests that diking and pumping be considered as an experimental step for the Bahamas. Measurements of water depths in lakes showed no rise or fall of the water level during a period of 10 hours, and Mr. Hull thinks there is little or no seepage.

FOREIGN PARASITE INTRODUCTION

Introduction of tachinid parasite of elm leaf beetle.--On December 20 the Melrose Highlands, Mass., field laboratory received a shipment of 5,500 elm leaf beetles from H. L. Parker, Hyeres, France. A note accompanying the material stated that dissections of a sample lot of these beetles showed that 20 percent contained the maggot of the tachinid fly Anachaetopsis nitidula Vill. The beetles are being kept under conditions considered satisfactory for hibernation, and it is hoped that a sufficient number of adults of the tachinid will issue next spring for satisfactory colonies. The tachinid was liberated by the laboratory for the first time in 1934, being obtained from material received from France.

FOREIGN PLANT QUARANTINES

Recent entomological interceptions of interest.--Thirty-eight living larvae of the Mediterranean fruit fly were intercepted at San Francisco in a single avocado fruit in baggage from Hawaii. Nine living larvae of the Mediterranean fruit fly were taken at New York in an apple in stores from Greece. Fourteen living larvae of the papaya fruit fly arrived at New Orleans in a papaya fruit in stores from Panama. Living specimens of Uleiota australis Er. were intercepted at Norfolk, Va., in walnut logs in cargo from Australia. The insects were found between the bark and the sapwood. A living adult of Parmenonta valida Thom. was taken at Mobile, Ala., on banana debris in cargo from Honduras. A living adult of Sinoxylon conigerum Gerst. was found at New York in a wooden ease in cargo from India. Living specimens of *Cicadella sirena* Stal, *Exitianus picatus* Gibson, and *Collaria oleosa* Dist. were collected on yam foliage in the field in Puerto Rico, the first at Isabela, and the remaining two at Mayaguez. *Targionia hartii* Ckll. was taken last April at Philadelphia on ginger in stores from Africa. *Silvanus vulgaris* Grouv. arrived at Boston with banana debris in cargo from Honduras. A living larva of the European corn borer was intercepted at New York in a tomato in stores from Italy. An orchid, *Dendrobium spectabile*, arriving at San Francisco in cargo from Borneo was infested with a pupa of *Baris orchivora* Blackb. This weevil is usually known incorrectly as *Acythopeus orchivorus* Blackb. Living larvae of the Mexican bean beetle were intercepted at El Paso, Tex., with spinach leaves in cargo from Mexico.

Recent pathological interceptions of interest.--*Bacterium maculicola* (McC.) was intercepted at New York on turnip leaves from Germany. The only previous interception of the disease on turnip was from England. Our first interception of *Cercospora destructiva* Rav. was made at Seattle on November 25 on *Euonymus japonica variegata* from Japan. *Colletotrichum nigrum* E. and H. was intercepted from France for the first time on December 8 on peppers at New York. A good specimen of *Gibellula arachnophila* (P. ex Ditm.) Vuillemin completely covering a small spider was received from San Juan, P. R. *Gloeosporium* sp. (unlike species reported on related plants) was intercepted at Washington on *Agapetes seligera* and *A. speciosa* from England. The first interception of *Glomerella cingulata vaccinii* Shear on *Vaccinium* was made December 1 at New York in a large shipment of frozen blueberries from Newfoundland. Our first interceptions of *Mycosphaerella brassicicola* (Fr.) Lindau were made at New York on cauliflower from Germany on November 28, November 30, and December 17 and from Belgium on December 10. *Scirrhia bambusae* Turconi was intercepted at Washington on bamboo supports for plants from Italy. This is our first interception of the disease which Stevenson's manual lists as occurring in Italy only. Our first interception of *Septoria chrysanthemella* Sacc. was made at Seattle on November 25, followed on November 30 by an interception at New York. The Seattle interception was on chrysanthemums from Japan while the New York material was from Germany. *Vermicularia* sp. (spores too small for *V. ophiopogonis* Pat.) was found at Washington on leaves of *Ophiopogon japonicus* from Istanbul, Turkey. *Iris alberti* infected with *Didymosphaeria* sp. was found at Washington, D. C., on October 30 in a shipment from Union of Soviet Socialist Republics. It differs from *D. minuta* Niessl. in its longer spores; *D. palustris* (B. & Br.) Sacc., the other species reported on iris, lacks measurements in the published descriptions. *Leptosphaeria circinans* (Fckl.) Sacc., a fungus said to cause root rot in alfalfa and several other hosts, was collected at Washington, D. C., on December 3 on *Medicago* sp. from Turkey. This fungus is not listed by Seymour as being present in North America. *Ascochyta heterophragmia* Passer. was found on December 5 on a few tea leaves (*Camellia japonica*) which passed through the inspection house at Washington, D. C. The plants were shipped from Nantes, France. There is no record of this fungus occurring in the United States. *Phyllosticta rabiei* (Pass.) Trott. was found on December 6 on *Cicer zangoneium* as a pod spot. The infected material originated in Union of Soviet Socialist Republics. Nematode interceptions included *Acroboles* n. sp. in tuberose bulbs from Mexico intercepted on October 26 at Nogales; *Anguillulina dipsaci* (Kuhn) Gerv. and v. Ben in carrot from England at New Orleans, in potato from Belgium on November 28 at

Philadelphia, and from Russia at Boston, in lily-of-the-valley from Germany at New York (6); *Anguillulina pratensis* (de Man) Goffert in lily-of-the-valley from Germany at New York (3); *Aphelenchoides parietinus* Bastian in carrot from Denmark at Philadelphia, in ginger root from China at Boston, in lily-of-the-valley from Germany at New York (6), and taro from Japan at New York; *Aphelenchus avenae* Bastian in lily-of-the-valley from Germany and in potatoes from Bermuda, both at New York; and *Heterodera marioni* (Cornu) Goodey in lily-of-the-valley from Germany at New York (4) and in potato from Japan at New York.

New nematode on elm.--A sterile fungus apparently of secondary importance was collected on November 17 in the bark of an elm burl from France offered for entry at Baltimore and sent to Washington for possible determination. Microscopic examination revealed the presence of numerous nemas and eggs. These were determined by Dr. Steiner as *Anguillulina* n. sp. It is said that this species is close to *A. major* Fuchs, an associate of the European bark beetle (*Ips typographus* L.).

Fruit fly in passengers' baggage.--From a special report on the inspection of baggage of passengers arriving on the S. S. *Saturnia* at New York on November 1, 1934, the following items are taken as illustrating the constant danger to which this country is being subjected through plants, fruits, and vegetables carried by tourists. This ship carried 1,150 passengers, including 200 first class, 350 tourist, and 600 third-class. Of the 22 sacks of fruits and vegetables found in their effects, 85 percent were taken from the third-class group, nearly all of this intercepted material being found in suitcases and trunks where the fly could pupate among the clothing and other articles and thereby be distributed far away from the port. Some of the fruit collected was examined for Mediterranean fruit fly, with the following findings: 6 live larvae from 2 oranges out of a lot of 25 from the Azores; 22 live larvae from 4 small sorbe fruits out of 5 pounds from the Azores; 20 larvae from 3 sorbe fruits out of 200 from Portugal, 100 percent infested; 1 live larva from an Italian orange in a lot of 35, apparently 25 percent infested. The remaining fruit in the 22 sacks was burned without further examination, as facilities are not available for safeguarding such a mass of material during the period of examination. The material included: Apples and quinces from the Azores; persimmons from Portugal; peaches, sweet limes, pomegranates, pricklypears, grapes, pears, apples, quinces, and green olives from Italy; persimmons and pomegranates from Greece; and pomegranates from Syria. It is estimated that if all this fruit had been examined it would have been found to harbor between 1,000 and 5,000 live larvae of the Mediterranean fruit fly.

Bulbous growth in coconut.--A bulbous growth obtained from a coconut and somewhat resembling a fungus gall was submitted by an inspector at Brownsville, Tex., in December. This growth, not often encountered in commercial coconuts, as it is not formed until a year or more after the nuts reach maturity, consists of the swelling base of the germinating embryo, the enlargement taking place at the expense of the absorbed meaty tissue. It is understood that on the west coast of Mexico this growth is eaten fresh and is regarded as a delicacy. It is also sold in the dried state on the markets as "coconut apples."

Citrus blackfly intercepted at Philadelphia.--From an orange branch found in possession of a passenger from the Bahama Islands who was stopped on the dock at Philadelphia on November 28, specimens of the citrus blackfly were taken, as well as the citrus whitefly, three known species of scale, two other scale insects as yet unidentified, an unidentified thrips, some insect egg masses, and a fungous disease on the leaves.

Stem borer in carnation.--In a shipment of 12 rooted carnations entering from England and examined at the Washington inspection house on December 21, there were found 11 larvae of a species of Hylemyia. This insect, which is related to the onion, cabbage, and seed-corn maggots, occurs in Europe and has been reported from British Columbia, Canada, and is difficult to detect on account of its habit of boring within the carnation stem.

DOMESTIC PLANT QUARANTINES

Checking Christmas-tree movements.--An unusually large number of shipments of Christmas trees and Christmas greens, moving as apparent infringements of the gypsy moth quarantine, were intercepted in transit during the season just closed. There were approximately 148 such infringements as compared with 45 in 1933. The car-lot movement of such trees was well under way early in December and during that month transit inspectors at Philadelphia, New York, Chicago, Cleveland, and Washington checked approximately 700 such car lots moving from New England points. The freight shipments, however, were found to be properly certified, the violations consisting of mail and express packages, nearly all of which were intercepted at Boston and New York. At the latter point, owing to better facilities for handling parcel post, the efficiency of inspection, especially during the Christmas rush, was greatly improved.

Transit inspection established at new points.--Transit inspection will be initiated the middle of January at Atlanta, Ga., the Bureau inspector to be assisted by a Georgia State nursery inspector. Temporary inspection will be instituted at Memphis, Tenn., and St. Louis, Mo., in January, and this work will be resumed at Kansas City early in February. The force at New York has been increased by the temporary assignment of a Bureau man employed on phony peach disease inspections at other periods of the year. Seasonal inspection is being made at Detroit, Mich., Cleveland, Ohio, and Indianapolis, Ind., by temporary assignment of inspectors from corn borer activities.

Citrus canker eradication in Texas.--Headquarters for Federal inspectors on citrus canker eradication in Texas have been transferred from Austin to Houston. An additional Federal inspector has recently been assigned to the work, and this force will shortly be supplemented by at least one more inspector. The cooperative force of four to five State inspectors, also working on eradication of this disease, will be supplemented by other State inspectors as available. During the month of December, 31,097 trees in 8 counties were inspected. No additional infections were found. The removal of all varieties of citrus trees susceptible to the canker has been accomplished on one of the two properties in the Galveston area where the disease has been known to exist for some time, the owners not having consented to the destruction of the infected trees until the latter part of November. The absence of susceptible species, it is believed, will tend to reduce the likelihood of recurring infection and of the eventual spread to the satsumas in the nearby orchard.

Citrus canker inspection in Louisiana.--All properties where trees are known to be grown in Ascension, Beauregard, Jefferson, and St. Charles Parishes were inspected in November, under cooperative arrangements with the State, and no citrus canker infection was found. The work covered 19,860 citrus trees in groves, and 37,248 in nurseries, and is a part of an intensive, complete inspection program which will include all known citrus plantings in the State.

Phony peach disease work in orchards in 1934.--The sixth seasonal campaign in the eradication of this disease from orchards was completed with the close of 1934, and the general decrease in the percentage of diseased trees over the entire period, as well as the increasing interest in the work manifested by commercial peach growers, is encouraging. A survey of orchards in Georgia the past season showed that in commercial orchards only 2.12 percent of the trees inspected showed infection of the disease as compared with 8.31 percent in home orchards inspected. A summary of the work of 1934 shows that in Georgia, Louisiana, and Texas, of the 4,650,420 trees inspected in commercial orchards, 98,621 were infected with the disease; and that of 68,116 trees inspected in home orchards, 3,062 were infected.

Phony peach disease control in nurseries.--During the season of 1934, Bureau inspectors, at the request of State officers concerned, cooperated in inspecting for the phony peach disease around 143 peach-growing nurseries in Alabama, Arkansas, Georgia, Illinois, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, and Texas. The inspections, which covered a radius of a mile around each nursery, resulted in the finding of 373 infected peach trees, which affected the status of nurseries containing 1,113,507 exposed trees; 2,878,913 trees were not found to be exposed to infection. Quarantines of most of the infected States provide that peach stock be accepted for shipment or sale either (1) if the environs of the nursery to the extent of 1 mile are free from the phony peach disease, or (2) if the peach nursery stock is inspected tree by tree at digging time or before shipment, and all trees infested by the peach borer are culled out and destroyed.

CONTROL INVESTIGATIONS

Dormant period of imported cabbage worm broken in greenhouse.--In November cabbage worms being reared by M. C. Swingle in a greenhouse at Beltsville, Md., failed to emerge as butterflies in the usual period. After a dormant period of about a month in the pupal stage at temperatures between

70° and 80° F. butterflies emerged, and the usual life cycle at these temperatures was resumed in December.

Pyrethrin content of alcoholic extracts of pyrethrum and their toxicity to house flies.--F. L. Campbell and W. N. Sullivan, Takoma Park, have begun a project in cooperation with the Food and Drug Administration to find out what chemical method of analysis for pyrethrins in alcoholic extracts give results best representing their insecticidal effect on house flies. Results so far obtained indicate that the problem is not a simple one.

Fall armyworm and corn ear worm being reared for laboratory tests of insecticides.--Material provided by W. H. Larrimer, Arlington, Va., is being reared with some success by J. W. Bulger at Takoma Park. At present the fall armyworm seems the more promising of the two species for winter work.

BEE CULTURE

Beekeepers' Congress.--Warren Whitcomb, Jr., and E. Oertel, of the Southern States Bee Culture Laboratory, and Jas. I Hambleton, Somerset, Md., attended a Beekeepers' Congress held at Valdosta, Ga., on December 17-20. This congress was participated in by several national organizations, including the American Honey Producers' League, the American Honey Institute, the Southern Beekeepers' Conference, and the Control Committee of the marketing agreement for package bees and queens. This was probably the largest meeting of beekeepers ever assembled in this country. Beekeeping leaders from 31 States were present, as well as a large delegation from Canada. The editors of all but one of the bee journals were in attendance, and practically all the large beekeeping supply houses were represented. The president of the American Honey Producers' League appointed a legislative committee for the purpose of giving aid to the States in legislative matters, particularly those affecting bee inspection and marketing and grading of honey. This committee was also instructed to sponsor apicultural work of the Bureau. A very strong feeling was evident at the meeting that the work of the Southern States Bee Culture Field Laboratory should be extended to include intensive research on problems relating to the shipping of package bees and queens. Purchasers of queenbees, in particular, have been complaining bitterly over the early losses of queens that have been sent through the mails. Several resolutions were adopted at the meeting, commending the work of the Bureau of Entomology and Plant Quarantine.

Beekeeping Short Course.--On January 8 and 9, W. J. Nolan, Somerset, was one of the speakers at the Beekeeping Short Course given by the Ontario Agricultural College at Guelph, under the direction of Dr. E. J. Dyce, Professor of Apiculture and Provincial Apiarist. Mr. Nolan discussed the symptoms of bee-brood diseases, the symptoms of adult bee diseases, the care of extracted honey from hive to container, and chemical and physical factors governing the secretion of nectar. The course lasted 10 days and about 100 people were in attendance. Some of those taking the course had had no experience with bees, while one operated 700 colonies. Great interest was manifest. Short courses were being given in other branches of agriculture at the same time, and the enrollment in these, too, was reported to be unusually large.

Meeting of Maryland Agricultural Association.--C. E. Burnside, Somerset, attended the annual meeting of the Maryland Agricultural Association, at Baltimore, on January 9 and addressed the Maryland Beekeepers' Association on the subject of plant poisoning of bees and brood. It is not definitely known that this type of poisoning is serious in Maryland; however, G. E. Abrams, Maryland State apiary inspector, reports having observed symptoms resembling those of plant poisoning of brood. Samples resembling brood killed by plant poisoning have also been received by the Bee Culture Laboratory from Maryland beekeepers. Those in attendance showed considerable interest in the subject and volunteered to report suspicious cases to the laboratory. The meeting was well attended and all sections of the State were represented.

California bees suffer from spray poison.--F. E. Todd, Davis, Calif., reports that the application of insecticides to California's fruit, vegetable, and field crops appears to be threatening the bee industry in several sections of the State. The chief damage reported was from dusting melons and peas in the Imperial Valley, tomatoes in the Sacramento Valley, and citrus and vegetables in other parts of the State. The use of airplanes for application has made the situation acute. The losses suffered by beekeepers during the past season haverun into many thousands of dollars, not only in reducing the beekeepers' prospective crops but also by destroying their capital investment in producing units. At the State Beekeepers' Association Convention held at Santa Ana, it was evident that the industry in many sections feels that this problem must be solved or the industry will go out of existence. The solution of the problem appears to have three possibilities: (1) The beekeepers feel that means should be provided for notifying them when insecticides are to be applied so that they can protect their property. Cooperation with the State Department of Agriculture and the agricultural commissioners on this phase of the problem was tentatively arranged at the Santa Ana convention. (2) The rights of the beekeepers, the commercial insecticide appliers, and the growers have not been clearly defined in California courts. It appears likely that sooner or later these rights will have to be defined by court action. (3) There is pressing need for research to develop insecticides less harmful to bees, for effective repellents and means of protecting colonies during spraying, and for procedure which will aid the recovery of colonies that have been sprayed. At the Pacific States Bee Culture Field Laboratory, at Davis, where airplane dusting of tomatoes caused considerable damage in 1934, trials were made on closing the hives from daybreak till noon for a period during the dusting and several days after. This method gave some promise of protecting the colonies from destruction, the basis for this procedure being that the source of damage to the hive was shown to be the pollen which was gathered largely during the morning hours. There are in California five or six local situations under which bees are damaged, each of which required special study. As far as funds will permit, studies similar to those at Davis will be made of the other situations in the State.

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Honey standardization.--Mr. Todd states that, contrary to reports he has received in previous years, discussion of honey standardization is now being given a wholehearted reception by California beekeepers. Standardization of containers is now being rapidly corrected by glass manufacturers, so that the chief interest in this subject is in the matter of standardized grading. The recent meeting of the California State Beekeepers' Association went on record as favoring the placing of honey standardization on the California statutes by the next legislature. The economic studies at the Davis laboratory, which have been conducted in cooperation with the University of California and the Oregon Agricultural Experiment Station, have undoubtedly done much to bring about the changed atmosphere and have crystallized the action taken. If and when California successfully concludes this project, all honey in Washington, Oregon, California, and Nevada will be placed on the market under standardized grading.

California beekeepers move colonies without closing entrances.--Beekeepers in California, according to Mr. Todd, have found that they can move bees much more satisfactorily and with less loss if they move them with the entrances open. This practice has grown to such an extent that probably half of the migratory beekeepers in the State are now moving colonies without closing the entrances. In a few cases, particularly in the Los Angeles area, keekeepers have stopped with truck loads of bees in populated sections at service stations and like places, and the bees have caused some nuisance. In addition, there was one wreck in the San Joaquin Valley this year that attracted the attention of the Highway Department. Many of the beekeepers feel with just cause that they are liable to be barred from the highways through legislative action unless they take the initiative to correct the trouble caused by beekeepers who have exercised poor judgment in the moving of colonies. Apparently colonies can be moved open in most parts of the State without the bees becoming a nuisance, while in the heavily populated centers, as at Los Angeles, this cannot be done.

The use of package bees for strengthening colonies.--Warren Whitcomb, Jr., of the Southern States Bee Culture Field Laboratory, Baton Rouge, La., reports that, in connection with the experimental shipments of bees made last year, some tests were attempted to determine the value of adding 2 pounds of bees without queens to colonies just at the beginning of the honey flow. In these tests 20 packages were added to colonies at Hallock, Minn., at Alba, Mich., and at Sheldon, Iowa. It is unfortunate that at Hallock and at Sheldon a failure of the honey flow made the tests valueless, although at Hallock the strengthened colonies made a much better start than the check colonies before the drought stopped the flow. At Alba, in one yard of about 60 colonies, 4 packages were united to weak colonies, 4 packages to medium colonies, and 4 packages to strong colonies. In each case, colonies similar in strength and provisions were used as checks. At the end of the honey flow the weak colonies showed a gain of between 20 and 30 pounds over the checks, the medium colonies showed a gain of approximately 45 pounds over the checks, and the strong colonies showed a gain of approximately 70 pounds over the checks. Complete data have not yet been received but the preliminary tests show that there may be justification for the strengthening of colonies just at the beginning of the honey flow. Beekeepers seem to be much interested in this work and several shippers have offered to supply bees for similar tests during the coming season.

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